REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on June 2, 2006, and the references cited therewith.

Claims 1-10 are pending in this application. Claims 2 and 5 and the specification is hereby amended.

Use of Trademarks

The specification has been amended by adding a paragraph after paragraph 10 to more clearly indicate the proprietary nature of the mark NAFION. This additional paragraph also clarified that the term "Nasicon" is an acronym known in the art to mean sodium super ionic conductors.

§112 Rejection of the Claims

Claims 2 and 5 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claim 2 was amended to more clearly identify the subject matter of the claim by removing references to a trademark and an acronym in the claim. Claim 5 was amended to correct a typographical error. Regarding Examiner's reference to perovskite, the term perovskite is known to those of skill in the art. Additionally, the "+δ" designation when used with a number of a molecule is known in the art to mean more than the stoichiometric amount of the molecule. For example, the designation $O_{4+\delta}$ is known to mean excess oxygen beyond the stoichiometric amount that would be found in O_4.

§102 Rejection of the Claims

Claims 1-4 and 6-10 were rejected under 35 USC § 102(b) as being anticipated by United States Patent No. 5,985,308 issued to Burrell et al. (hereinafter the "the '308 Patent"). Claims 1-4 and 6-8 were rejected under 35 USC § 102(e) as being anticipated by United States Patent No. 6,333,093 issued to Burrell et al (hereinafter the '093 Patent).

Applicant respectfully submits that neither the '308 nor the '093 Patents anticipate applicant's claims invention. Applicant claims "a reactive material associated with the support material." Neither of the cited references disclose a reactive material.

The "308 and "093 Patents deal with forming anti-microbial material containing one or more metals. The method comprises creating atomic disorder in the material under certain

conditions. This increases the solubility of the material and allows the material to release metal in certain forms into a solvent. The solvent then provides the desired antimicrobial effects. See '308 Patent, Col. 4, lines 24-35 and Col. 6, lines 44-65; '309 Patent, Col. 10, lines 24-52. The released ions maintain their composition and merely become solutes in a solvent.

In contrast, Applicant's invention does not create an antimicrobial solvent and does not use solubility as the desired method to make antimicrobial material. Instead, Applicant's invention provides material that can react with the various microbes or contaminants that it comes in contact with to chemically form a new compound; not just the same compound as a solute in a solvent. Applicant claims "reactive material associated with the support material." The specification provides many examples of such a reactive material that are captured in the dependent claims. These materials are not taught by either cited reference and the cited references do not anticipate Applicant's claims 1-7 that all contain the reactive material limitation.

Applicant claims peroxides, photoactive materials, and excess oxygen containing compounds as sub classes of reactive materials. The Examiner cites Burrell as teaching metal oxides in anticipation of Applicant's claims. However, metal oxides are different than metal peroxides and metal superoxides. When oxygen reacts with a metal, the usual product is an ionic oxide containing the oxide ion, O^{2-}. For example, in the case of magnesium, the oxide that forms is MgO. The peroxide, MgO_2 on the other hand has a different anion portion to the molecule. Instead of O^{2-} it has O_2^{2-}, where 2 oxygen atoms are covalently bonded each other. The peroxide is much more reactive than the oxide which is very inert. Likewise a superoxide is also different from an oxide. In the superoxide the anion is O_2^-, again where 2 oxygen atoms are covalently bonded to each other but containing an incomplete octet in the outer electron shell resulting in a different valence than the peroxide anion. An example of a super oxide is potassium superoxide, KO_2 as opposed to potassium oxide, K_2O. Applicant teaches use of reactive material in the form of the known peroxides MgO_2, BaO_2, SnO_2, AgO, CaO_2, CuO_2 and ZnO_2. None of these compounds are metal oxides, but rather reactive materials that will chemically react with microbes, disinfectants, and the like to form new compounds while providing an antimicrobial or other beneficial effect.

The prior art teaches the use of oxides which are much different chemically than peroxides and superoxides. The latter substances are more reactive than the oxides and are more useful for the purposes described in Applicant's invention. Accordingly the cited references do not teach peroxides.

The cited references do not teach water insoluble excess oxygen containing compounds. The cited references teach increased solubility, not insolubility. The cited reference do not give any examples of excess oxygen containing compounds nor teach their use in any way. Oxides are not excess oxygen containing compounds. They are stable with their Oxygen molecule and do not have excess oxygen to give. The "+δ" designation when used with a number of a molecule is known in the art to mean more than the stoichiometric amount of the molecule. For example, the designation $O_{4+\delta}$ is known to mean excess oxygen beyond the stoichiometric amount that would be found in O_4. Excess oxygen containing compounds are less stable and thus reactive, which accomplish the purposes of Applicant's invention not the inventions disclosed in the cited references. The cited references do not teach excess oxygen containing compounds and certainly not insoluble ones. Accordingly, the cited references do not teach each and every limitation of Applicant's claims 1-10.

New claims 11-14 each contain the limitation of photoactive materials. These new claims do not contain new matter and are fully disclosed in paragraph 44 of Applicant's specification. Neither of the references teach photoactive materials.

Applicant claims the use of photoactive compounds as a reactive material for providing beneficial effects. Although some of the materials are oxides, most oxides are not photocatalytic or photoactive. When Burrell in the prior art generally talks about the use of metal oxides, his discussion relates to introducing metal ions into a solvent. Burrell makes no mention of using metal oxides that specifically are photoactive as a beneficial material. Compare photoactive anatase to non-photoactive rutile. Both materials have the same composition, titanium oxide TiO_2, except their atomic structures, and therefore their crystal forms, are different. Unlike rutile, anatase can be activated by photons to a reactive state which can be beneficial for reacting to disinfect surfaces. Burrell does not teach using photoactive materials, oxides or otherwise for this purpose. Applicant teaches using photoactive materials some of which are oxides for this beneficial purpose. Accordingly, the cited references do not anticipate Applicant's new claims.

§103 Rejection of the Claims

Claim 5 was rejected under 35 USC § 103(a) as being unpatentable over any of the '308 Patent or the '093 Patent. Claim 5 teaches specific water insoluble excess oxygen containing compounds including the perovskites of $La_2NiO_{4+\delta}$, $La_2CuO_{4+\delta}$, $CeNiO_{4+\delta}$ and $Ce_2CuO_{4+\delta}$. Each element of a claim must be contained in the combined 103 references for the references to support an obviousness rejection. The cited references do not. The cited references to not teach all of the limitation of claim 1 from which claim 5 depends. Further, as Examiner notes, the cited references do not teach the perovskites recited in claim 5. The examiner states that it would have been obvious to one having ordinary skill in the art to select metal oxides according to availability and compatability. However, it would not have been obvious given the cited references to use water insoluble perovskite structures as claimed by Applicant. There is not suggestion in the cited references to suggest such a leap. The cited references teach atomic disorder to increase the solubility and thus the release of metal cations into a solvent. Applicant teaches away from this by using insoluble compounds. Additionally, by using the oxides taught in the cited references, you would not be able to achieve the instability utilized in Applicant's to accomplish Applicant's purposes. Accordingly, the cited references are improper 103 references.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (801-978-2186) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 50-3586

Respectfully submitted,

ASHOK V. JOSHI

By his Representatives,

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By his Representatives,

Date 10/2/2006

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